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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/026,029 | 12/18/2001 | Charles T. Rettner | ARC920010114US1 | 8707 |

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| EXAMINER | |
|---|---|
| RODRIGUEZ, GLENDA P | |
| **ART UNIT** | **PAPER NUMBER** |
| 2651 | |

DATE MAILED: 06/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/026,029 | RETTNER ET AL. | |
| | Examiner | Art Unit | |
| | Glenda P. Rodriguez | 2651 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *23 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-29 and 31-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-29, 33-37and 45 -47* is/are allowed.

6)☒ Claim(s) *31,32,38-44 and 48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *4/26/04* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. Examiner would like to make of record that the preliminary amendment of March 15, 2002 has been considered.

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Daniel Johnson on 4/26/05.

Please add right after the title "Summary of the Invention if Page 4 of the Applicant's Specification:

"Preferred embodiments of the invention employ a physical phenomenon known to those skilled in the art as a "surface plasmon". As suggested by this term, a plasmon involves "plasma" consisting of electrons separated from ion cores in a conducting medium. This plasma can form a charge density wave, and when this wave is localized close to the surface of the conducting medium, the resulting excitation is termed a "surface plasmon". Incident electromagnetic radiation can excite a surface plasmon under certain resonance conditions (such as "modes") that conserve energy and momentum. Suitably positioned features (such as slits and ridges) facilitate the coupling of incident electromagnetic radiation to certain surface plasmon modes. The electromagnetic field of the excited surface plasmon than gives rise to optical output, which is then advantageously radiated away an emission region and may be directed to, for example, a recording medium."

Also, add on Page 16 of the Applicant's Specification, right after --width of the-- add the word "slit".

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 38 rejected under 35 U.S.C. 102(e) as being anticipated by Fuji et al. (US Patent No. 6, 876, 603).

Regarding Claim 38, Fuji et al. teaches a method, comprising:

> Directing input optical radiation onto metallic features of a structure, wherein the features have a spatial configuration selected to increase optical transmission from an emission region in the structure beyond what the optical transmission from the emission region would be in the absence of the features (Col. 13, L. 25-32 and Col. 14, L. 52-58, wherein Fuji et al. teaches increasing of the transmitted light output from the optical radiation structure.); and
>
> Directing output optical radiation from the emission region onto a recording medium, in order to heat the recording medium and thereby assist in the recording of data in the recording medium (Col. 14, L. 37-47).

Claim (48) has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim (48) however also recite the following limitations..."

setting up surface charges around the features (Col. 13, L. 25-32 and See Col. 4, L. 44-65. Because the optical output emits a light at a high temperature in order to emit an increased light, then the medium is able to charge the surface of the head in order for that phenomenon to occur.)."

Regarding Claim 41, Fuji et al. teach all the limitations of Claim 38. Fuji et al. further teaches reading back data recorded in the medium (Col. 14, L. 37-47, wherein Fuji et al. teaches a read/write structure, therefore it is inherent that a reading operation can be involved in the structure.).

Regarding Claim 44, Fuji et al. teach all the limitations of Claim 38, Fuji et al. further teaches wherein setting up surface charges around the features (Col. 13, L. 25-32 and See Col. 4, L. 44-65. Because the optical output emits a light at a high temperature in order to emit an increased light, then the medium is able to charge the surface of the head in order for that phenomenon to occur.).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (US Patent No. 5, 199, 090) in view of Hopkins et al. (US Patent No. 5, 625, 617).

Regarding Claim 31, Bell teach an apparatus for facilitating the recording of data, comprising:

> An optical source (Pat. No. 5, 199, 090; Col. 4, L. 1-4);
>
> A structure that receives optical radiation from the optical source and emits optical output from an emission region in said structure, said structure having an array of metallic features that couple the radiation from one side of said structure to another side of said structure to increase the emitted optical output from said emission region beyond what the emitted optical output from said emission region would be in the absence of said features (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);
>
> And at least one element secured to said metallic structure, said at least one element generating magnetic fields for writing data in a data recording medium located within the near-field portion (Pat. No. 5, 199, 090; Abstract).

However, Bell does not explicitly disclose wherein the emitted optical output includes a near-field portion that extends from said emission region out to a distance less than the average wavelength of the emitted optical output and a platform as described in the Claim. Hopkins et al. does disclose the use of a near-field portion wherein the distance from the emission region to the emitted optical output is less than a emission wavelength (Pat. No. 5, 625, 617; Abstract and Col. 2, L. 51-55 and Col. 3, L. 24-37. Hopkins et al. teach a near-field portion that its distance is controlled according to a determined wavelength (i.e. "average" wavelength as described by the Applicant in the Specification portion of the Application).) and a platform is configured to be moved relative to a data recording medium while the separation between said emission region

and a surface of the data recording medium is kept to less than said average wavelength (Pat. No. 5, 625, 617; Fig. 10 and Col. 9, L. 13-46). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Bell's invention with the teaching of Hopkins et al. in order to provide a higher photon flux to a data storage and retrieval device.

7. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji et al. in view of Kanbe et al. (US Patent No. 6, 623, 874). Fuji et al. teach all the limitations of Claim 38. However, Fuji et al. does not explicitly disclose a grain size in the order between 10 and 250 cubic nanometers. Kanbe et al. teach a grain size of 98.91 $nm^3$ (It is known by an artisan of ordinary skill in the art that the average grain size is less than 5 nm (for example 3 nm in diameter) and the magnetic layer film thickness is 14 nm, resulting in the grain size having a 98.91 cubic nanometer measurement grain size, which falls between the specified range from 10 to 250 cubic nm (and 10-500 nm) according to the Applicant's Specification. See Pat. No. 6, 623, 874; Col. 9, L. 28-44 and Col. 10, L. 10-12). It is obvious to a person of ordinary skill in the art, at the tie the invention was made, to modify the combination of Fuji et al.'s invention with the teaching of Kanbe et al. in order to implement a highly reliable magnetic recording medium.

8. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (US Patent No. 5, 199, 090) in view of Kanbe et al. (US Patent No. 6, 623, 874).

Regarding Claims 32, Bell teaches a method of directing optical radiation onto a recording medium, comprising:

> Providing a metal structure having an emission region and an array of metallic features that enhance optical transmission through the emission region beyond

what the optical transmission through the emission region would be in the absence of the features (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

Directing optical radiation onto the array of features (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

Directing optical output from the emission region onto a recording medium to facilitate the recording of data (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

However, Bell does not explicitly disclose reading data with a processor and a grain size between 10 and 250 cubic nanometers. Kanbe et al. teach reading data with a processor (Pat. No. 6, 623, 874; Col. 5, L. 6-32) and a grain size of 98.91 $nm^3$ (it is known by an artisan of ordinary skill in the art that the average grain size is less than 5 nm (for example 3 nm in diameter) and the magnetic layer film thickness is 14 nm, resulting in the grain size having a 98.91 cubic nanometer measurement grain size. See Pat. No. 6, 623, 874; Col. 9, L. 28-44 and Col. 10, L. 10-12). It is obvious to a person of ordinary skill in the art, at the tie the invention was made, to modify Bell's invention with the teaching of Kanbe et al. with a processor in order to implement a highly reliable magnetic recording medium.

9. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji et al. in view of Berini (US Patent No. 6, 614, 960). The combination of Bell and Hopkins et al. teach all the limitations of Claim 38. However, Fuji et al. does not explicitly disclose wherein the spatial configuration includes a periodic array. Berini teaches an optical device wherein the spacing between said features in said metal structure is periodic (Pat. No. 6, 614, 960; Col. 34, L. 39-45).

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fuji et al.'s invention with the teaching of Berini in order to implement a prescribed transfer function.

***Allowable Subject Matter***

10. Claim 42 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the primary reason for allowable subject matter is the inclusion of the limitation wherein the optical transmission from the emission region is higher as a result of at least one surface plasmon mode generated by directing the optical radiation input.

11. Claims 1-29, 33-37, 45, 46 and 47 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding Claim 1, the primary reason for allowance is the inclusion of the limitation wherein a metallic structure having an array of features that couple the radiation to at least one surface plasmon mode to the structure to increase the emitted optical output from the emission region.

Regarding Claims 23, 29 and 33, the primary reason for allowance is the inclusion of the limitation wherein directing optical radiation onto the array of features to generate at least one surface plasmon mode, thereby enhancing the optical output emanating from an emission region in the metallic structure.

Regarding Claim 48, the primary reason for allowance is the inclusion of the limitation wherein generating surface plasmons in a structure, in order to direct optical radiation produced by the surface plasmons onto a magnetic medium and thus heat a portion of the medium, thereby recording the data.

Regarding Claim 34, the primary reason for allowance is the inclusion of the limitation wherein directing optical radiation onto the array of features to generate at least one surface plasmon mode, thereby enhancing the optical output emanating from an emission region in the metallic structure.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

Applicant's arguments with respect to claims 31, 32, 38-44 and 48 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenda P. Rodriguez whose telephone number is (571) 272-7561. The examiner can normally be reached on Monday thru Thursday: 7:00-5:00; alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gpr
June 3, 2005.

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